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Abstract

Background: Tanning equipment use is related to the early onset of cancer, with the risk increasing as the duration and repetition of exposure increase. In 2009, the International Agency for Research on Cancer classified tanning equipment use as carcinogenic to humans, and according to the World Health Organization, the risk of skin melanoma increases significantly when use begins before age 35.

Data and methods: The rapid response component of the 2014 Canadian Community Health Survey collected data on the use of tanning equipment in the previous 12 months, including reasons for use, frequency/duration of use, precautions taken, and adverse reactions or injuries. This analysis examines the prevalence of self-reported indoor tanning in a nationally representative sample of Canadians aged 12 or older in the 10 provinces.

Results: In 2014, 4.5% of Canadians (an estimated 1.35 million) reported that they had used tanning equipment in the past year; 70.3% of them were female, and just over half of female users were aged 18 to 34. The prevalence of indoor tanning was highest among people with some postsecondary education and among those in higher income households (trend p-value < 0.0001). Most users reported fewer than 10 sessions in the past year. The most common reason (62.0%) was to develop a "protective" base tan.

Interpretation: Females made up the majority of tanning equipment users, particularly at ages 18 to 34. Efforts to increase awareness of the risks may be beneficial, given the high percentage of users who believed that indoor tanning offers some level of skin protection from future sun exposure.

Key words: Eye protection, injury, sunbathing, sunburn, sunlamp, ultraviolet rays, warning labels

Skin cancer is the most common type of cancer in Canada, and melanoma is its deadliest form. Excessive exposure to ultraviolet radiation is recognized as the primary cause of skin cancer, with the incidence rate almost doubling since the 1990s.[1] It was estimated that 81,700 Canadians would develop some form of skin cancer in 2013 and that 1,470 would die from it.[1] These numbers are projected to rise,[2] based on Canada's aging population and previous tanning behaviour.

It is well documented that repeated exposure to ultraviolet (UV) A and B radiation from tanning may cause sunburn, premature skin aging, immunosuppression, and increased risk of skin cancer. Tanning is also implicated in the development of cataracts and other eye diseases.[3] In 2009, the International Agency for Research on Cancer (IARC) classified the use of UV-emitting tanning devices as "carcinogenic to humans (Group 1)."[4] This was a result of a 2006 IARC meta-analysis that determined the risk of developing skin melanoma increases by 75% when tanning equipment use begins before age 35.[5] A subsequent meta-analysis containing six additional studies showed a significant, yet somewhat lower summary relative risk of 59%.[6] Furthermore, the risks are cumulative, escalating with total hours, sessions, or years of tanning equipment use.[7]

In 2014, the Canadian Community Health Survey collected data on tanning equipment use by residents of the 10 provinces, including frequency of use, reasons for use, injury, and the efficacy of labelling and safety information provided with these devices. Based on these data, this analysis presents prevalence estimates of indoor tanning and associated injury.

Data and methods

Data source

Statistics Canada's Canadian Community Health Survey (CCHS) collects health-related data from the Canadian population for use at the national, provincial and regional levels. The data analyzed in this article are from the CCHS rapid response module on Tanning Equipment Use, which took place from March through June 2014. Respondents were asked about their use of tanning equipment during the past 12 months. The CCHS questionnaire was administered directly to respondents in computer-assisted telephone interviews.

The CCHS covers the household population aged 12 or older in the provinces and territories. The survey excludes people living on reserves or in other Aboriginal settlements in the provinces; full-time members of the Canadian Forces; residents of institutions; and residents of the Quebec health regions of Région du Nunavik and Région des Terres-Cries-de-la-Baie-James. Together, these exclusions represent less than 3% of the population aged 12 or older. The rapid response module on Tanning Equipment Use covered the same population, but excluded the three territories.

Overall, 31,709 individuals were in-scope for the 2014 CCHS, with valid responses obtained for 19,765, yielding an overall response rate of 62.3%. A detailed description of the CCHS methodology and sources used can be found on the Statistics Canada website: http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3226.

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Measures

The CCHS rapid response Tanning Equipment Use module was divided into several components. The first set of questions identified people who may be at higher risk of injury; for example, "Would you characterize yourself as a person with sensitive skin who regularly gets a sunburn from exposure to sun or tanning equipment?" Questions were asked about the frequency of and reasons for the use of sunlamps or tanning equipment in the past year. Other questions examined precautions taken by users; for example, "Did you wear eye protection, such as goggles, while using the sunlamp or tanning equipment?"

A series of questions determined if users were aware of the risks, such as whether they had read the warning labels on the equipment, and if not, their reasons for not doing so. In Canada, manufacturers are required to provide an exposure schedule, based on skin type, on tanning equipment. Because patrons of tanning salons often ignore manufacturers' recommended exposure,[8,9] the CCHS asked if respondents followed these schedules.

Finally, questions were asked about injuries or adverse reactions, particularly to the skin and eyes. All questions are available on the Statistics Canada website: http://www23.statcan.gc.ca/imdb/p3Instr.pl?Function=assembleInstr&Item_Id=164080

Table 1
Prevalence of and unadjusted odds ratios relating tanning equipment use in past year to selected characteristics, household population aged 12 or older, Canada excluding territories, 2014

Characteristic	%	95% confidence interval from	95% confidence interval to	Odds ratio	95% confidence interval from	95% confidence interval to
Sex						
Male†	2.7	2.2	3.2	1.00	...	...
Female	6.2	5.6	6.9	2.38*	1.88	3.02
Age group						
12 to 17	1.7[E]	0.9	2.5	0.60†	0.30	1.20
18 to 34	8.2	7.1	9.3	3.09*	2.28	4.19
35 to 44	5.2	3.9	6.5	1.91*	1.25	2.92
45 or older†	2.7	2.3	3.2	1.00	...	...
Education						
Secondary diploma or equivalent or less	3.9	3.2	4.5	1.12	0.79	1.58
Some postsecondary (certificate/diploma including trade)	5.9	5.1	6.7	1.69*	1.22	2.34
University certificate, diploma or degree†	3.6	2.8	4.4	1.00	...	...
Not applicable/Don't know/Refusal/Not stated	F	F	F	F	F	F
Household income						
$39,999 or less	3.3	2.5	4.0	...	...	...
$40,000 to $69,999	3.9	3.1	4.7	...	...	...
$70,000 to $99,999	4.9	3.8	6.0	...	...	...
$100,000 to $149,999	4.7	3.6	5.7	...	...	...
$150,000 or more	6.7	5.2	8.2	...	...	...
Region						
Atlantic	4.8	3.7	5.9	1.42	0.93	2.17
Quebec	4.5	3.6	5.5	1.33	0.88	2.00
Ontario†	3.5	2.8	4.1	1.00	...	...
West	5.7	4.8	6.5	1.67*	1.15	2.42
Race (Ethnicity)						
Caucasian	5.2	4.7	5.7	2.43[E]*	1.75	3.37
Other†	2.2	1.5	2.9	1.00	...	...
Not applicable/Don't know/Refusal/Not stated	3.4[E]	1.5	5.3	...	...	...

... not applicable
[E] use with caution
F too unreliable to be published
* significantly different from reference category ($p < 0.05$)
† reference category
Source: 2014 Canadian Community Health Survey, Tanning Equipment Use module.

Statistical analysis

The analyses were based on a sample of 19,765 respondents aged 12 or older in the 10 provinces. To be representative of the Canadian population, data analyses were weighted and performed using SAS EG 4.2 (SAS Institute Inc., USA). The SAS procedure SURVEYFREQ was used to calculate percentages and coefficients of variation (CVs). Data with a CV from 16.6% to 33.3% are identified by an (E) and should be interpreted with caution; data with a CV greater than 33.3% are suppressed (F) due to extreme sampling variability. To test differences in prevalence between sociodemographic groups, the procedure SURVEYLOGISTIC was used to calculate odds ratios and corresponding confidence intervals with Bonferroni adjustments for pairwise comparisons. The ESTIMATE statement of the procedure SURVEYLOGISTIC was used to test for a linear trend in the use of tanning equipment across household income levels. Both procedures took account of sampling weights and estimated variance using bootstrap weights.

Results

In 2014, 4.5% of Canadians aged 12 or older (an estimated 1.35 million) reported that they had used tanning equipment in the past year (Table 1). About a quarter (28.0%) of tanning equipment users considered themselves to have sunburn-sensitive skin; the corresponding figure for the population overall was 31.8% (data not shown).

The prevalence of indoor tanning was higher among females than males (6.2% versus 2.7%). The highest prevalence—8.2%—was at ages 18 to 34. Reflecting the higher prevalences among women and at younger ages, a substantial majority—70.3%—of users were female, and more than half of female users were younger than 35 (data not shown). Although several provinces restrict use by individuals younger than 18, a small percentage (1.7%[E]) of 12- to 17-year-olds reported indoor tanning.

These differences by sex and age group were statistically significant. Females' odds of indoor tanning significantly exceeded those of males (OR: 2.38; 95% CI: 1.88, 3.02) (Table 1). The odds were higher at ages 18 to 34 than at age 45 or older (OR: 3.09; 95% CI: 2.28, 4.19) or at any other age (data not shown). As well, 35- to 44-year-olds had almost twice the odds of using tanning equipment, compared with individuals aged 45 or older (OR: 1.91; 95% CI: 1.25, 2.92).

The prevalence of indoor tanning was 5.9% among people with "some postsecondary (certificate/diploma)," compared with 3.6% of those with a "university certificate, diploma or degree" and 3.9% of those with "secondary graduation or less." People with "some postsecondary (certificate/diploma)" had higher odds of using tanning equipment than did university graduates (OR 1.69; 95% CI: 1.22, 2.34).

A statistically significant ($p < 0.0001$) positive linear trend emerged across income levels—the higher the household income, the higher the person's probability of using tanning equipment.

Indoor tanning varied by region, ranging from less than 4% in Ontario to almost 6% in the West. Compared with Ontario residents, the odds of use among residents of Western Canada were significantly higher (OR: 1.67; 95% CI: 1.15, 2.42). The odds for residents of the other regions were not significantly different from Ontario.

The leading reason for indoor tanning was to develop a base tan (62.0%). Far fewer users reported aesthetic reasons (21.0%), to relax or feel better (15.8%), to boost the immune system and/or obtain vitamin D (8.9%[E]), and/or to treat a skin condition or other medical condition (4.3%[E]) (Table 2).

The majority (73.4%) of tanning equipment users reported fewer than 10 sessions in the past year. However, 24.9%[E] of regular users (at least 10 sessions in the past year) had 11 to 31 sessions in the last month.

Table 2
Factors involved in tanning equipment use, household population aged 12 or older, Canada excluding territories, 2014

Factor	%	95% confidence interval from	to
Reasons for use[†]			
Get base tan	62.0	57.3	66.6
Aesthetic	21.0	17.2	24.8
Relax/Feel better	15.8	12.4	19.2
Boost immune system	8.9[E]	5.9	12.0
Treat skin condition	4.3[E]	2.8	5.9
Prevent cancer	F	F	F
Other	6.6[E]	4.2	9.1
Frequency of use (per year)			
Periodic (fewer than 10 sessions)	73.4	69.2	77.6
Regular (10 or more sessions)	26.5	22.2	30.7
Frequency of use in last month (regular users)			
1 to 10 sessions	69.9	60.7	79.1
11 to 31 sessions	24.9[E]	16.0	33.8
Not available/Don't know/Refusal/Not stated	5.2[E]	2.0	8.4
Wore eye protection			
Yes	84.5	80.5	88.5
No	14.0	10.1	17.8
Read warning labels each session in past year			
Yes	51.7	46.8	56.5
No	48.1	43.2	52.9
Reasons for not reading warning labels[†]			
Read in past	61.4	54.4	68.3
Not important	16.2[E]	9.7	22.8
Did not notice labels	12.9[E]	8.7	17.1
Given oral instructions by attendant	7.2[E]	3.8	10.6
No warning labels	F	F	F
Didn't have time	F	F	F
Unreadable	F	F	F
Other	5.6[E]	3.2	7.9
Followed exposure schedule in past year			
Yes	80.2	75.8	84.7
No	18.4	14.0	22.8
Reasons for not following exposure schedule[†]			
Followed first time	23.8[E]	11.0	36.6
No exposure schedule	22.3[E]	12.1	32.6
Given different exposure schedule by attendant	F	F	F
Forgot	F	F	F
Other	44.7	32.3	57.2
Discomfort/Injury to skin in past year			
Yes	10.4	7.5	13.2
No	89.6	86.7	92.5
Number of episodes of discomfort/injury to skin in past year			
1	56.3	41.4	71.3
2 to 12	41.7[E]	26.8	56.7
Not applicable/Don't know/Refused/Not stated	F	F	F
Number of days discomfort/injury lasted			
2 or fewer	69.7	55.4	84
More than 2	28.1[E]	13.6	42.6
Not applicable/Don't know/Refused/Not stated	F	F	F

[E] use with caution
F too unreliable to be published
[†] because respondents could report more than one reason, detail adds to more than 100%
Source: 2014 Canadian Community Health Survey, Tanning Equipment Use module.

Most users (84.5%) wore eye protection during their tanning sessions. About half (51.7%) read the warning labels on the equipment before each session. Among the 48.1% who did not, the most common reason was "have read them in the past" (61.4%); "didn't care or want to read the labels" (16.2%[E]), "did not notice them" (12.9%[E]), and "were given oral instructions by the attendant" (7.2%[E]) were cited much less frequently.

While the majority (80.2%) of users followed the exposure schedule, 18.4% did not. Their main reasons were that "they followed it when they first used the equipment" (23.8%[E]) and "no exposure schedule posted" (22.3%[E]).

Skin discomfort or injury (sunburn, discolouration, itch) following a session was reported by 10.4% of tanning equipment users. Just over half (56.3%) of the injuries occurred only once during the previous 12 months, and for most people who were injured (69.7%), the symptoms persisted for no more than two days. Reports of eye injury or discomfort were rare (data not shown).

Discussion

A decade ago in 2006, the National Sun Survey (NSS) collected data to estimate ultraviolet radiation exposure, sun protection, and related knowledge, attitudes and beliefs among Canadians.[10,11] Computer-assisted telephone interviews were conducted with 7,121 people aged 16 or older across the country. The response rate was 63%. According to the NSS, 9% of Canadians had used tanning equipment during the previous 12 months, double the percentage reported to the 2014 CCHS (4.5%).

The lower prevalence of tanning equipment use in 2014 might be attributable to greater understanding of the hazards. The IARC's 2009 classification of UV radiation from tanning equipment as "carcinogenic to humans" (Class 1)[12] received widespread media attention and may have altered Canadians' perceptions of the risks. However, the media attention may also have affected how respondents answer survey questions about tanning behaviour if they see it as socially undesirable.

Variations in prevalence rates could also be due to sampling bias, differing age group representation in the NSS and CCHS, and differences in how the survey questions were posed. Questions about frequency were almost identical in the two surveys, but questions about reasons for use differed. For example, the CCHS provided reasons for indoor tanning, to which respondents replied with a "yes" or "no." In the NSS, similar reasons were given, but respondents were asked to rank them according to importance.

Both the CCHS and the NSS found indoor tanning to be more prevalent among females.[10] This is consistent with international data indicating that lifetime and past-year exposure were higher among women than men, regardless of age.[13] According to the 2006 NSS, 11% of women, compared with 3% of men, used tanning equipment; the corresponding figures from the 2014 CCHS were 6.2% among women and 2.7% among men. Therefore, the decline in use occurred exclusively among women. While the age categories examined in the two national surveys were different, both found indoor tanning to be more common among younger women than among those aged 45 or older.

According to the NSS, the motivation of 74% of tanning equipment users was to protect against future sunburns or to develop a base tan.[10] This is similar to the CCHS results—62.0% of users reported getting a base tan as a reason. However, several studies have shown that a base tan provides little protection against future sunburns, and any protection provided would be modest compared with that offered by sunscreen use.[14-17] Furthermore, no compelling evidence suggests that a base tan reduces the risk of melanoma or non-melanoma skin cancers.[18-20]

In the current study, 10.4% of tanning equipment users reported some form of post-session skin discomfort or injury in the past year. This percentage is lower than that observed in a study of Quebec residents, among whom an injury rate of 18% was reported.[21]

Although 14.0% of tanning equipment users did not wear protective goggles, very few reported eye injuries. Other studies have found even higher percentages of tanning equipment users did not wear protective goggles.[22,23]

Since the 2014 CCHS, changes have been implemented in the regulation of tanning equipment use across Canada. Labelling requirements have been strengthened under the *Radiation Emitting Devices Act*.[24] All equipment must display a more detailed decal containing the following messages: "Not recommended for use by those under 18 years of age" and "Tanning Equipment Can Cause Cancer," as well as a concise list of health risks associated with tanning. Most provinces and territories now restrict, or require consent for, the use of tanning equipment in commercial establishments by minors. Future analyses may be beneficial in assessing the impact of these initiatives.

What is already known on this subject?

- Skin cancer is the most common type of cancer in Canada.
- Indoor tanning is carcinogenic to humans; the risk of skin melanoma increases substantially if tanning equipment use begins before age 35.
- The risks are cumulative, escalating with total hours, sessions, and years of tanning equipment use.

What does this study add?

- In 2014, 4.5% of Canadians aged 12 or older reported that they had used tanning equipment in the past year, down from 9% in the 2006 NSS, which collected data from people aged 16 or older.
- Indoor tanning remained most prevalent among women, particularly at ages 18 to 34.
- Almost half (48.1%) of tanning equipment users did not read the warning labels, and 18.4% did not follow the recommended exposure schedule.

Limitations

The findings of this study should be considered in the context of a couple of limitations. First, the design is not ideal for assessing injuries. Different types of injury, whether to the eye (itchiness, light aversion, redness) or to the skin (sunburn, discoloration, itch), were included under a single category (discomfort and/or injury), which prevents reporting specific types of injury. Second, respondents were asked only about injury from indoor tanning in the past year. Lifetime injuries, particularly among people in older age groups who no longer use such devices, might have provided a more comprehensive picture of injury rates.

Conclusion

Despite a decrease in prevalence over the last decade, a large number of Canadians continue to use tanning equipment. Women, particularly those aged 18 to 34, are more likely than men to engage in indoor tanning. As well, use tends to rise with household income. Users' major motivation was to develop a base tan. This may reflect a lack of information and the misperception that indoor tanning somehow protects against sunburn from natural outdoor sun exposure. ■

References

1. Canadian Cancer Society. *Canadian Cancer Statistics, 2013*. Available at: http://www.cancer.ca/en/cancer-information/cancer-101/canadian-cancer-statistics-publication/?region=on. Accessed April 30, 2015.
2. Xie L, Semenciw R, Mery L. Cancer incidence in Canada: trends and projections (1983-2032). *Health Promotion and Chronic Disease Prevention in Canada* 2015; 35(Suppl 1): 2-186.
3. Gallagher RP, Lee TK. Adverse effects of ultraviolet radiation: a brief review. *Progress in Biophysics and Molecular Biology* 2006; 92(1): 119-31.
4. El Ghissassi F, Baan R, Straif K, et al. A review of human carcinogens—part D: radiation. *Lancet Oncology* 2009; 10(8): 751-2.
5. International Agency of Research on Cancer. The association of use of sunbeds with cutaneous malignant melanoma and other skin cancers: A systematic review. *International Journal of Cancer* 2007; 120(5): 1116-22.
6. Boniol M, Autier P, Boyle P, Gandini S. Cutaneous melanoma attributable to sunbed use: systematic review and meta-analysis. *British Medical Journal* 2012; 345:e4757. Erratum correction: http://www.bmj.com/content/345/bmj.e8503
7. Lazovich D, Vogel RI, Berwick M, et al. Indoor tanning and risk of melanoma: a case-control study in a highly exposed population. *Cancer Epidemiology, Biomarkers and Prevention* 2010; 19(6): 1557-68.
8. Kwon HT, Mayer JA, Walker KK, et al. Promotion of frequent tanning sessions by indoor tanning facilities: two studies. *Journal of the American Academy of Dermatology* 2002; 46(5): 700-5.
9. Culley CA, Mayer JA, Eckhardt L, et al. Compliance with federal and state legislation by indoor tanning facilities in San Diego. *Journal of the American Academy of Dermatology* 2001; 44(1): 53-60.
10. Marrett LD, Northrup DA, Pichora EC, et al. The Second National Sun Survey: overview and methods. *Canadian Journal of Public Health* 2010; 101(4): 110-113.
11. Ontario Sun Safety Working Group. *Insight on Cancer: Sun Exposure and Protective Behaviours in Ontario – An Ontario Report Based on the 2006 National Sun Survey*. Available at: http://www.uvnetwork.ca/InsightonCancerSunExposureandProtectiveBehavioursinOntarioFinal.pdf
12. International Agency for Research on Cancer. *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 100D (2012): Radiation*. Lyon, France: International Agency for Research on Cancer, 2012.
13. Wehner MR, Chren MM, Nameth D, et al. International prevalence of indoor tanning: a systematic review and meta-analysis. *Journal of the American Medical Association Dermatology* 2014; 150(4): 390-400.
14. Miyamura Y, Coelho SG, Schlenz K, et al. The deceptive nature of UVA tanning versus the modest protective effects of UVB tanning on human skin. *Pigment Cell Melanoma Research* 2011; 24(1): 136-47. Epub 2010 October 6.
15. Bech-Thomsen N, Wulf HC. Photoprotection due to pigmentation and epidermal thickness after repeated exposure to ultraviolet light and psoralen plus ultraviolet A therapy. *Photodermatology, Photoimmunology and Photomedicine* 1996; 11(5-6): 213-8.
16. Procaccini EM, Napolitano A, Panzella L, et al. Long-lasting pigmentation more than its intensity is a reliable indicator of skin sun resistance. *Dermatology* 2007; 215(3): 173-9.
17. Juzeniene A, Moan J. Beneficial effects of UV radiation other than via vitamin D production. *Dermato Endocrinology* 2012; 4(2): 109-17.
18. Hollovary E. Does a base tan protect from future burns or give a false sense of security? *Clinical Journal of Oncology Nursing* 2009; 13(1): 103-4.
19. Eller MS, Gilchrest BA. Tanning as part of the eukaryotic SOS response. *Pigment Cell Research* 2000; 13(Suppl 8): 94-7.
20. Lim HW, James WD, Rigel DS, et al. Adverse effects of ultraviolet radiation from the use of indoor tanning equipment: time to ban the tan. *Journal of the American Academy of Dermatology* 2011; 64(5): 893-902.
21. Rhainds M, De Guire L, Claveau J. A population-based survey on the use of artificial tanning devices in the Province of Québec, Canada. *Journal of the American Academy of Dermatology* 1999; 40(4): 572-6.
22. Knight JM, Kirincich AN, Farmer ER, Hood AF. Awareness of the risks of tanning lamps does not influence behavior among college students. *Archives of Dermatology* 2002; 138(10): 1311-5.
23. Szepietowski JC, Nowicka D, Soter K, et al. Tanning salons in southwest Poland: a survey of safety standards and professional knowledge of the staff. *Photodermatology, Photoimmunology and Photomedicine* 2002; 18(4): 179-82.
24. Department of Justice Canada. *Radiation Emitting Devices Regulations* (C.R.C., c. 1370). Available at: http://laws-lois.justice.gc.ca/eng/regulations/C.R.C._c._1370/index.html